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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/605,085	06/26/2000	Jonathan H. Gross	IRI05342	3378

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MOTOROLA, INC.  
CORPORATE LAW DEPARTMENT - #56-238  
3102 NORTH 56TH STREET  
PHOENIX, AZ 85018

EXAMINER

D AGOSTA, STEPHEN M

ART UNIT	PAPER NUMBER
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2683

DATE MAILED: 01/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/605,085

Applicant(s)

GROSS ET AL.

Examiner

Stephen M. D'Agosta

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_. 6) ☐ Other: \_\_\_\_\_

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## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments filed 12-30-03 have been fully considered but they are not persuasive:

1. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, all the prior art cited deals with the same problem(s) solved by the applicant, more specifically, cellular communications. The examiner is not swayed by the applicant's arguments since the prior art cited, as a body of knowledge and as known to one skilled in the art, discloses all the limitations as claimed by the applicant and supports the examiner's motivation to combine. All teach air/ground-based RF cellular communications and the operations necessary to support such communications. The 35 USC 103 combination and rejections are valid.

2. The applicant argues that "a list of viable handoff cell site candidates for handoffs between one or more beams and terrestrial cell sites" is not taught. The examiner disagrees since Barnett teaches prioritization of neighboring cells that determines its inclusion in a measurement list for handing off (abstract).

3. The applicant argues that "determination of one or more beams based on flight patterns" is not taught. The examiner disagrees since Ross teaches directing an adaptive antenna array that uses the plane's position vector (title, abstract) which reads on the claim (and would be used for transmission/reception of signals). The applicant ALSO argues that teachings of certain prior art is based on terrestrial-only or airplane-based communications. The examiner notes that both technologies provide the same operational support and are therefore combinable.

4. The applicant argues (claim 3) that a handoff list and directing an antenna array as it moves is not taught. Both Barnett (abstract) and Ross (title, abstract) disclose art which reads on the claim (eg. Barnett teaches a list of candidate cells for handoff and Ross teaches directing an adaptive array).

5. The applicant argues (claim 4) that ranking of handoff sites is not taught based on probability. Barnett teaches a prioritization list of neighboring cells which, as known by one skilled in the art, is typically based on signal strength and the probability of the user roaming to a certain location/cell site.

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6. The applicant argues (claim 6) that Hogg does not calculate a list of handoff sites performed for each respective beam. The examiner disagrees and cites figure 2, #40 and C5, L29-54 which reads on the claim.

7. The applicant argues (claim 12) that prior art does not teach comprising dividing the handoff list into time sensitive candidates and non-time sensitive candidates. The examiner disagrees since Martin teaches support for both time/non-time sensitive data which one skilled in the art can transmit based on QoS as is known in the art.

8. The applicant argues (claim 14) that flight pattern information is not taught. The examiner disagrees since Ross (abstract) teaches directing a airplane antenna array as does Martin (abstract, figure 1). Other art cited teaches obtaining location, heading, position of a mobile user (ie. person, car, aircraft, etc.).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-14 and 16-20** rejected under 35 U.S.C. 103(a) as being unpatentable over Hogg et al. US 6,104,926 and further in view of (Ray et al. US 5,557,656 or ARCSS Slides or Gilhousen WO9602094 AND Martin et al. US 6,061,562, Ross US 6,275,187, Upton EP0803742, Alanara et al. US 6,061,561 and Barnett et al. US 5,509,051).

As per **claim 1**, Hogg [or RAY (abstract) or ARCSS (all slides) or Gilhousen (abstract)] teaches a method of maintaining a terrestrial cell site handoff list for airborne cellular system (C8, L61-67 to C9, L1-8 and figures 1-28 and C3, L54-57) comprising:

**But is silent on**

Maintaining a fixed beam pattern of beams transmitted from an airplane relative to cellular system users

Determining locations of respective cell sites within a vicinity of footprints of the respective beams transmitted from the airplane

Determining a location and heading of the plane

Determining location of each of the one or more beams transmitted from the airplane based on airplane flight pattern data

Determining locations of respective cell sites within a vicinity of the footprints of the one or more beams transmitted from the airplane

Calculating a list of viable handoff terrestrial cell site candidates for handoffs between one or more beams and terrestrial cell sites based on maintaining a fixed beam pattern, the location and heading of the airplane, the locations of respective beams transmitted from the airplane based on airplane flight pattern and the locations of respective cell sites

**Martin** teaches maintaining a fixed beam pattern of beams transmitted from an airplane relative to cellular system users (figure 1, #16, #40 and #42 and #46) and determining locations of respective cell sites within a vicinity of footprints of the respective beams transmitted from the airplane (figure 1 shows that airplane must be aware of cell sites #42 it is communicating with within its footprints).

**Martin** (abstract, figures 1, 2, 4 and 8a), **Ross** (figure 1 and abstract), **Upton** (abstract) and **Alanara** (figures 1-10 and abstract) all disclose obtaining location/heading/position of a "mobile user" (eg. person, car, aircraft).

**Ross** teaches directing respective beams transmitted from the airplane based on airplane flight pattern data (figure 1 and abstract).

**Barnett** teaches Calculating a list of viable handoff terrestrial cell site candidates based on maintaining of a fixed beam pattern, the determining of a location and heading of the user/airplane, the determination of locations of respective beams transmitted from the user/airplane based on user/airplane movement/flight pattern and the determining of locations of respective cell sites (the examiner notes that while Barnett is focused on a mobile user and a BTS, it is broadly interpreted as reading on the claim simply by replacing the "mobile user" with an "aircraft" as taught by the art above).

***With further respect to claim 13***, Martin is silent on a database and processor. Barnett teaches a measurement list that is determined which requires a processor and storage.

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that the system uses location of plane and beams and cell sites in footprint/vicinity to calculate handoff list, to provide means for the system to support plane-based handoffs as the plane roams.

As per **claim 2**, Hogg teaches claim 1 **but is silent on** teaches determination of location and heading comprises a receiving flight pattern location of the airplane via telemetry link.

Martin teaches flight pattern via telemetry (C5, L30-42 and C8, L23-39 and C8, L57-62) and Ross teaches determination of aircraft position (abstract).

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that flight pattern is used via telemetry, to provide means for ground contrl to determine plane location/flight pattern for communication support.

As per **claim 3**, Hogg teaches claim 1 **but is silent on** wherein the step of calculating a list of viable cell sites comprises mapping data generated from the steps of maintaining fixed beam pattern, determining of location/heading of airplane, determining beams transmitted form airplane flight pattern and determining location of cell sites to a database of viable handoff cell site candidates.

Barnet teaches a handoff candidate list/database (abstract).

Ross teaches directing an aircraft antenna array as it moves.

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that viable candidate list comprises uses beam pattern, location of airpland, beams transmitted from plane and location of cells, to provide means for using this data to support optimal communications support between user and BTS.

As per **claim 4**, Hogg teaches claim 1 **but is silent on** ranking each handoff site based on probability data found during calculating list of candidate sites.

Barnet teaches prioritization list of neighboring cells (title and abstract).

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that ranking is used, to provide means for prioritizing which cell site(s) are viable as handoff candidates.

As per **claims 5 and 20**, Hogg teaches claim 4/18 and using protocol dependence for cell site candidate list C7, L61-67 and C8, L1-52 – the user and cell being operable on two systems and/or possible of voice and data transmission).

As per **claim 6**, Hogg teaches claim 1 wherein the list of handoff sites is performed for each respective beams transmitted from airplane (figure 2, #40, C5, L29-54).

As per **claims 7 and 18**, Hogg teaches claim 6 **but is silent on** comprising dividing up list of handoff sites into multiple candidate groups according to geographic locations within of the one or more beams and cycling through multiple candidate groups to further reduce the list of handoff candidates based on multiple groups.

Barnet teaches prioritization of neighboring cells which can be grouped as required based upon user needs (ie. signal strength, location, heading, etc.).

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that the handoff list is divided into groups based on location within each by and cycling through the groups to reduce list of candidates, to correlate cell locations and beam(s) supporting the cell(s) for optimal handoff support.

As per **claim 8**, Hogg teaches claim 7 **but is silent on** wherein cycling through groups introduces an associated handoff delay.

Barnet teaches calculating and prioritizing neighboring cells for a list of candidate handoff cell sites. This inherently requires time for calculation and hence would create an associated handoff delay.

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that a handoff delay is introduced, since the calculation requires a finite amount of time to perform.

As per **claim 9**, Hogg teaches claim 1 comprising updating list of handoff sites as a function of time as the airplane pattern changes (figure 2 shows the plane #32 moving and its connections to various BTS's #36 as changing based).

As per **claim 10**, Hogg teaches claim 1 **but is silent on** wherein calculating a list of viable cell sites is performed to compensate for flight pattern changes caused by adverse weather conditions.

Martin teaches interference by weather, buildings, trees, vehicles and terrain (C4, L49-60 and C12, L30-64).

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that a handoff list is based on flight patterns caused by adverse weather, to provide means for compensating for situations that will cause poor RF communications.

As per **claim 11**, Hogg teaches claim 1 comprising calculating viable airplane beams (C5, L5-10, C8, L27-37 and L61-67 and C9, L1-8) **but is silent on** beams for receiving handoffs from cell sites and creating an airplane beam handoff list based on the calculating of viable airplane beams.

Martin teaches (figure 1 #40 and 42) that as the plane moves, handoffs would occur based on the beam the RF link is being supported by.

Barnet teaches cell site handoff prioritization (abstract).

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that beam handoff list is determined, to provide means for controlling beams for handing off RF links for optimal communications.

As per **claim 12**, Hogg teaches claim 1 **but is silent on** comprising dividing the list of handoff sites into time sensitive candidates and non-time sensitive handoff candidates.

Martin discloses supporting data such as voice, cable, video etc. (C2, L22-35) and these are time sensitive whereby an ISP (C2, L34) may be supporting data such as



email is (less) time sensitive. One skilled in the art would provide for identifying time sensitive and non-time sensitive data for better quality of service.

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that the handoff list is divided for time and non-time sensitive sites, to provide QoS to those links/users who require it.

As per **claim 14**, Hogg teaches claim 13 **but is silent on** the flight pattern information comprises airplane location, heading and beam footprint information.

**Ross** teaches directing an airplane's antenna array/footprint as does **Martin** (figure 1 shows footprint(s)).

Martin (abstract, figures 1, 2, 4 and 8a), Ross (figure 1 and abstract), Upton (abstract) and Alanara (figures 1-10 and abstract) all disclose obtaining location/heading/position of a "mobile user" (eg. person, car, aircraft).

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that flight pattern includes location, heading and beam footprint, to provide information between mobile and fixed ground station so they understand each other's position, heading and coverage to support all RF links optimally.

As per **claim 16**, Hogg teaches claim 13 wherein the receiver, database and processor are in the airplane and communicate with ground-based control station via telemetry link (figure 3, #46, C5, L30-42 and C6, L5-67 to C7, L1-7 and C8, L23-39).

As per **claim 17**, Hogg teaches claim 13 **but is silent on** wherein the handoff candidate list includes cell sites within a single communication beam.

Barnet teaches handoff list (abstract).

Martin teaches a system with multiple beam uplink/downlinks (figure 1, #40) for communication/handoff.

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that handoff list includes sites within a single beam, to provide means for understanding how each user is connected/supported and if/when a handoff will be required (between beams, BTS's, etc.).

As per **claim 19**, Hogg teaches claim 13 **but is silent on** processor calculates handoff list for terrestrial sites to beams.

Barnet teaches a neighbor handoff list.

Martin teaches a system with multiple beam uplink/downlinks (figure 1, #40) for communication/handoff.

One skilled in the art would use the handoff list and correlate it to uplink/downlink beams for optimal operation.

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that the processor calculates handoffs, to provide means for a computer to perform all operations for automatic handoff.

**Claim 15** rejected under 35 U.S.C. 103(a) as being unpatentable over Hogg/Marting and further in view of Ayyagari et al. EP0837567

As per **claim 15**, Hogg teaches claim 13 **but is silent on** wherein the database and processor are implemented in ground-based BTS.

Barnet teaches ground-based communication for mobile users (abstract implies ground-based communications) and Ayyagari teaches a ground-based control system for airborne broadband communication network (abstract).

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that the database and processor are ground based, to reduce hardware required in the airplane/air (which reduces weight).

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen M. D'Agosta whose telephone number is 703-306-5426. The examiner can normally be reached on M-F, 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Trost can be reached on 703-308-5318. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist on 703-306-0377.

SMD

1-16-04



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